S/085/62/000/012/002/002
E192/E382

AUTHOR: Leonov, N., Engineer

TITLE: Radio and radar in aircraft

PERIODICAL: Kryl'ya rodiny, no. 12, 1962, 25 - 27

TEXT: A general description of the principles of operation and the use of various radio equipment and radar navigation aids in modern aircraft is given. The following items are mentioned: control, communications and distress-signalling radio equipment; automatic radio compass; radio altimeter for low altitudes; marker, course and glide receivers and radio range-finder; the radar aids include panoramic (mapping) equipment, an altimeter for high altitudes and apparatus for determining the flight velocity and the drift angle. There are 4 figures.

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LEONOV, N., inzh.-podpolkovnik

Crystals can work long. Av. i kosm. 46 no.4:59-64 Ap '64.
(MIRA 17:3)

LEONOV, N.A.

The seven-year plan for the development of the public health system in the Tajik S.S.R. Zdrav.Tadzh. 6 no.2:5-7 Mr-Ap '59. (MIRA 12:9)

1. Nachal'nik planovo-finansovogo otdela Ministerstva zdravookhraneniya Tadzhikskoy SSR.
(TAJIKISTAN--PUBLIC HEALTH)

LEONOV, N. D.

Leonov, N. D. - "On symmetry in the distribution of isotopes", (Report), Soobshch. o nauch. rabotakh chlenov Vsesoyuz. khim. o-va im. Mendeleyeva, 1949, Issue 2, p. 19.

SO: U-4630, 16 Sept. 53, (Letopis 'Zhurnal 'nykh Statey, No. 23, 1949).

LEBNOV, N. D.

4

Interaction of chlorophyll with ions of iron. V. I. Dulova, N. D. Leonov, N. V. Vontrilova, and L. A. Vvedenskaya. *Trudy Fiz.-Tekh. Inst., Akad. Nauk Uzbek. S.S.R.* 6, 82-9(1956).—Interaction between chlorophyll (a + b), as well as individual components, and $FeCl_3$ labelled with Fe^{59} was examd. *in vitro* at room temp. in Et_2O-MeOH-AmOAc, pyridine, and Me_2CO, Et_2O-EtOH, Et_2O-Me_2CO, and Et_2O-Me_2CO. The reaction takes place best in 8:2 Et_2O-Me_2CO, and is also favored by the presence of AmOAc. Addn. of HCl to make 0.001*N* soln. does not retard the reaction, but 0.01*N* HCl retards it drastically. Reactions of $FeCl_3$ with pheophytin show the same pattern although the reactivity is much smaller. The reaction was followed spectroscopically. The reactions involve an oxidation of chlorophyll with simultaneous formation of a deriv. contg. Fe and the oxidation product; the spectra of these derivs. from chlorophylls a and b show slight differences in the ultraviolet (spectra are reproduced). The green absorption band of normal chlorophyll is absent in the products of the reaction. In MeOH the addn. of $FeCl_3$ to chlorophyll soln. results in lowering of the red absorption max. and in increasing this max. on addn. of $FeCl_3$; these 2 changes are apparently not connected with formation of an Fe deriv. of chlorophyll. The radio-Fe tracer was used to follow the path of Fe in wash liquors and filtrates. G. M. K.

LEONOV, N. D.

3

Determination of forms of phosphorus compounds in plants with the use of radioactive phosphorus. V. I. Dulova, N. D. Leonov, and N. V. Vostrilova. *Trudy Fiz.-Tekh. Inst., Akad. Nauk Uzbek. S.S.R.* 6, 90-3(1955).—The plant matter is extd. 12 hrs. in a Soxhlet app. with Et_2O, then 2-3 hrs. with boiling EtOH. EtOH is distd. off and the residue is taken up in the Et_2O ext., which is then shaken twice with 2% HCl to remove acid-sol. P compds. The Et_2O soln. of the phosphatide fraction is then evapd. and subjected to usual P detn., preferably by the use of P^{32} activity. The residual plant matter after the above extns. is kept 1 day with 2% HCl and the extn. is repeated twice. The HCl ext. is combined with the HCl washing from the phosphatide fraction above, the mixt. is neutralized with 20% NaOH, inorg. P and phytin are pptd. with magnesia mixt., the ppt. is filtered off, dissolved in 30–40% HNO_3, filtered, treated with 100 mg. of KH_2PO_4, and the P content is pptd. with molybdate; the ppt. is transformed into NH_4 Mg phosphate and its P^{32} activity is detd. conventionally to give the sum of inorg. P and phytin. The filtrate, remaining after sepn. of inorg. P and phytin, is analyzed for carbohydrate phosphates through the Ba salts; the Ba salt of hexosediphosphate is taken up in HNO_3, freed of Ba with H_2SO_4, subjected to wet combustion (unspecified reagents) and after addn. of 100 mg. KH_2PO_4, the P is pptd. as Mg NH_4 phosphate and its activity is detd. The filtrate from the Ba hexosediphosphate is freed of Ba, subjected to wet combustion and after addn. of carrier KH_2PO_4, the detn. of activity is made as above to give the detn. of hexosemonophosphate and glycerophosphate. This sepn. into carbohydrate fractions does not proceed well and often the hexosediphosphate detn. is very low. The plant residue after HCl extn. is washed with EtOH and Et_2O, dried and subjected to usual combustion and detn. of P^{32} activity. It was shown that in the HCl extn. step the extn. of acid-sol. P compds. proceeds even after two 24 hr. extns. The possibility of hydrolysis of nucleoproteins in much longer acid extn. made necessary the stoppage of HCl extn. at this time. G. M. Kosolapoff

LEONOV, N.F., assistant.

Manufacture of gears by hot rolling. Nauch.trudy NPI 30(44): 143-147 '55. (MLRA 9:11)
(Gearing)

LEONOV, N.G.
card 4

PHASE I BOOK EXPLOITATION 421

Leningrad. Tsentral'nyy in: .'+ut prognozov

Voprosy sinopticheskoy meteorologii (Problems in Synoptical Meteorology) Moscow, Gidrometeoizdat, Moskovskoye otdelniye, 1957. 129 p. (Its: Trudy, vyp. 61) 1,300 copies printed.

Ed. (title page): Uspenskiy, B.D.; Ed. (inside book): Sadovskiy, V.N.; Tech. Ed.: Zarkh, I.M.

PURPOSE: The collection of articles is intended for specialists working in the field of weather forecasting.

COVERAGE: The collection discusses the relationship between atmospheric pressure and weather forecasting.

TABLE OF CONTENTS:

The article examines a series of problems which might possibly offer some explanation as to the evolution of cyclones and

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and anticyclones; these problems are still unsolved, despite the abundance of theoretcial and empirical data. One of these problems is the effect of thermobaric field structures on the origin of the cyclone and anticyclone, and also on the process of cooling and warming air by advection. The author analyzes the results of 110 observed cyclones and 82 anticyclones and discusses: (1) The geostrophic wind velocity along the isobaric levels of 700, 500, and 300 millibars and the horizontal temperature gradients at the 500 millibar level in the area of cyclones and anticyclones over the central, cold, and warm sections; (2) the advection of vortices at 700,500,and 300 mb isobaric levels and advective changes of temperature in the 500-1000 mb layers over the central section of cyclones and anticyclones; (3) the changes in the turbulent air movement and their dependence on elevation in the near-surface layer of the cyclonic area; (4) the changes in the mean temperature at 500-1000, 300-500, and 200-300 mb levels in the process of development of cyclones and anticyclones; and finally (5) the changes in baric pressures observed during a 12-hour interval. All the points considered may facilitate forecasting.

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There are 15 tables, 3 drawings, and 8 Soviet references.

Tomashevich, L.M. Cyclone Regeneration and the Effects of Vertical Currents on Thermobaric Field 56

The author analyzes the process and the effect of the penetration of air masses,mostly of cold air, into a cyclone area; such an injection (intrusion) represents a new source of energy capable of reviving a dying cyclone. The regeneration of a cyclone is linked with the deepening of the cyclone area; new fronts are created, the upward movement is intensified, the former direction of the cyclone movement is changed, and the precipitation is increased. Since a regenerated cyclone causes considerable shift in the prevailing weather conditions, these conditions can be predicted from some of the symptoms of the regeneration occurring. The author explains the nature of the regenerated cyclone and describes the principal changes which occur at AT700 (absolute topography at 700 millibar level). The explanation is theoretical

and is based on the selected coefficients of vorticity; in this connection, reference is made to V.A. Bugayev who worked out a mathematical solution of the problem of vorticity. Statistical data are derived from observations conducted between 1947 and 1951. Two pages of the author's own conclusions contain data on the distribution of velocities for primary and regenerated cyclones in various stages of their development and on the accompanying temperature behavior. The essential indications for the regeneration of a cyclone are given. There are 11 drawings, 5 tables, and 8 Soviet references.

Leonov, N.G. Cyclone Displacements Due to the Structure of the Baric Field in the Atmosphere 82

The author examines the rule of the leading jet in predicting the possible direction of a cyclone. This rule implies that cyclones move at 700-500 millibar levels with the direction of the wind above the cyclone area. However, since information on such winds is difficult to obtain, the author discusses and evaluates the possibility of using the data on the geostrophic

wind present over cyclonic areas. The author arrives at the conclusion that displacements of cyclones are affected by factors other than the winds alone. There are 29 tables, 3 figures, and no references.

Shishkova, I.A. Methods of Calculating Local Accelerations 111

The author reviews the problem of deviation of local winds from the geostrophic wind and offers an empirical rule for determining the direction of any such deviation through an analysis of local accelerations. Of particular importance in such cases is whether or not the wind in question deviates toward a low pressure or a high pressure area and at what velocity it moves. The mathematical solution, suggested by the author, results in 76-78 percent correct predicitions as to the direction of the wind. The author concludes that no connection exists between variations in the velocity of the wind and the direction it takes. An increase (or decrease) in wind intensity within 12 hours can occur with deviations toward either the high or low pressure areas. There are 2 figures and 3 Soviet references.

Card 5/7

Glazova, O.P. Determination of Maximum Daily Air Temperature by Vertical Sounding of the Atmosphere 120

The author recapitulates the standard method of evaluting the radiation balance for the interval of time between sunrise and the moment of maximum daily temperature, including the determination of the latter. Reference is made to the efforts of N.I. Bel'skiy and Ye. Gol'd which were directed to this end. The American meteorologist T. Williams is also mentioned in this connection, but his technique is rejected as not applicable to conditions in the European USSR. Bel'skiy's version is accepted by the author and explained in detail. Elaborating on Bel'skiy's method, the author of the article considers the following meteorological factors essential for the determination of maximum temperature: the flow of solar radiation, the dynamic turbulence, and the horizontal displacement of the air caused by the temperature gradient. The mathematical method reduces to defining the value of what is called by the author "an elementary square," a quadrangle enclosed between isobars with a 10 mb spread and isotherms 1° apart. This area

corresponds to the amount of heat (2.45 calories) required to raise the temperature of an air column 1° C, the column having a cross section of 1 cm^2 and a height corresponding to a pressure difference of 10 mb. The weight of the air column is 10.2 grams and its specific heat 0.24. The article examines also the role of dynamic turbulence in changing the air temperature in the near-surface layer (i.e. 300-400 meters), when there is no advection. There are 3 tables, 3 figures, and 6 references, of which 4 are Soviet and 2 English.

AVAILABLE: Library of Congress

MM/ksv
6-23-58

Card 7/7

S/124/62/000/001/028/046
D237/D304

AUTHOR: Leonov, N. G.

TITLE: Motion of low altitude centers of cyclones

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 1, 1962, 92, abstract 1B634 (Tr. Tsentr. in-ta prognozov, 1958, no. 70, 3-12)

TEXT: The author utilizes the results of the solution of forecast equation for $\partial H/\partial t$ (I. A. Kibel'. Vvedeniye v gidrodinamicheskiye metody kratkosrochnogo prognoza pogody. M., Gostekhizdat, 1957 - RZhMekh, 1959, no. 8, 8988) to obtain formulas for determining the velocity of motion of low altitude baric centers (c) in the form of volume integrals containing advection of the vortex and temperatures at various levels. Graphs of active functions and corresponding weights are given for calculating c. Calculation of 15 examples of c for various cyclones show that, with the corresponding method of determining advection

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C

AUTHOR: Leonov, N. G.

SOV/ 50-58-6-2/24

TITLE: Some Characteristic Features of the Change of Winds With Respect to Altitude Over the Eastern Coast of the Antarctic (Nekotoryye osobennosti izmeneniya vetra s vysotoy nad vostochnym poberezh'yem Antarktidy)

PERIODICAL: Meteorologiya i gidrologiya, 1958, Nr 6, pp. 8 - 13 (USSR)

ABSTRACT: The conditions at the surface of the earth in the antarctic are very strange. They are described. Data obtained from pilot balloons of the Mirnyy and Mauson stations are taken as a basis. The data on the number of investigated observations are given in Table 1. The recurrence in % of the east and west wind components at various altitudes and in various months are given in Table 2. On the strength of these facts the author arrives at the following conclusions: 1) In the majority of cases at the east coast of the antarctic in the lower strata an east wind component is found. This proves the assumption that as a rule a high pressure field exists above the antarctic. 2) The recurrence of the east component decreases according to the altitude while that of the west

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Some Characteristic Features of the Change of Winds With Respect to Altitude Over the Eastern Coast of the Antarctic

SOV/50-58-6-2/24

one increases. Beginning with an altitude of from 3 - 6 km the range of lower pressure dominates. 3) The seasonal characteristics of the changing over from an anticyclonic circulation to a cyclonic circulation are described. 4) The changing over from a summer type of circulation to an autumn type takes place sufficiently abrupt and jump-like. Either the activity of ozone in the respective stratum is suddenly decreased or the active ozone stratum is shifted in the direction towards the ocean. 5) Cases occur all over the year where the area of high pressure above the antarctic covers the whole troposphere. In winter this occurs relatively rarely, in summer more frequently. 6) During the major part of the year, except summer, the antarctic anticyclone is with respect to the altitude not so well developed in the area of Mauson than is the case in the area of Mirnyy. 7) The activity of the ozone stratum in the area of Mauson is more marked than at Mirnyy. There are 2 tables.

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1. Meteorology--Antarctic regions 2. Winds--Direction
3. Meteorological balloons--Test results 4. Wind--Determination

3(3) SOV/3223

PHASE I BOOK EXPLOITATION

Akademiya nauk SSSR. Komplekznaya antarkticheskaya ekspeditsiya

Klimat Antarktiki (Climate of the Antarctic) Moscow, Gosizdat, 1960. 295 p. (Series: Its: Trudy; Meteorologiya i klimatologiya) Errata slip inserted. 4,000 copies printed.

Ed.: S. M. Kushelevs; Tech. Ed.: S. M. Koshelevs; Editorial Board: V. F. Bykhanov, B. L. Dzerdzeyevskiy, Kh. P. Pogosyan, and O. A. Tauber.

PURPOSE: This book is intended for meteorologists and climatologists. It will be of interest to all earth scientists concerned with the Antarctic region.

COVERAGE: This book contains 18 articles on the weather and climate of Antarctica. Articles represent the generalized results of processing data obtained by the Soviets during their expeditions to the Antarctic, 1955-1958. Individual authors have attempted to clarify and unify previously divergent views on Antarctic meteorological processes (zonal circulation, temperature distributions, cyclonic and anticyclonic movement, etc.). No personalities are mentioned. References accompany individual articles.

TABLE OF CONTENTS:

SOV/50-59-8-4/19

3 (7)
AUTHOR: Leonov, N. G.

TITLE: Meridional Transfer in the Areas of Mirnyy and Mauson (Meridional'nyy perenos v rayonakh Mirnogo i Mausona)

PERIODICAL: Meteorologiya i gidrologiya, 1959, Nr 8, pp 15 - 19 (USSR)

ABSTRACT: To clarify the characteristics of the meridional transfer above the east coast of the Antarctic country, the data obtained in sounding the atmosphere in Mirnyy and Mauson with respect to the wind during the 1st continental Antarctic Expedition (from March 1956 to February 1957) were analyzed here. On the basis of this analysis, the following facts could be ascertained: 1) In the troposphere, the direction of the meridional transfer is different in Mirnyy and in Mauson: the northern transfer prevails in Mirnyy, the southern one in Mauson. 2) In the stratosphere, the northern transfer prevails in the areas of Mirnyy and Mauson. This prevailing becomes more distinct with an increasing altitude. 3) The zonal component of the horizontal temperature gradient in the area of Mirnyy is directed in the troposphere on an average from east to west, and in the stratosphere from west to east. In the area of Mauson, this component is directed from east to west both in the troposphere and in the

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stratosphere. 4) On the coast of the eastern Antarctic, near the meridian of Mirnyy, the stationing of cyclones, which shift along the southern Indian Ocean, often takes place. 5) In winter, the shifting of cyclones takes place above the southern Indian Ocean, normally with a large meridional (southern) component. In spring, a zonal shifting of cyclones from west to east is mostly observed near the coast of the Antarctic country. There are 2 figures and 1 table.

S/050/60/000/05/02/020
B007/B014

AUTHORS: Burtsev, A. I., Leonov, N. G.

TITLE: Slope of the Spatial Axis of Baric Systems

PERIODICAL: Meteorologiya i gidrologiya, 1960, No. 5, pp. 11-16

TEXT: Quantitative relations between the spatial axis slope of the baric center and the characteristics of the thermobaric field are derived in the paper under review. Formulas (1), (2), and (3) are written down for the spatial axis of the baric system, and therefrom, the differential equations (11) are obtained for the position of the axis of the baric system in the space. If there is fairly sufficient accuracy, the spatial axis of baric systems between two main isobaric planes can be assumed to be a straight line. Moreover, the symmetry axes can be regarded as the coordinate axes. Formula (13) is obtained. It follows therefrom that the shift of the center of baric systems at the upper level with respect to the system center at the lower level can be determined by the following 4 factors: the horizontal temperature gradients (T_x, T_y), the thickness

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Slope of the Spatial Axis of Baric Systems S/050/60/000/05/02/020
B007/B014

of the isobaric layer ($p - p_o$), the quantities H_{xx}, H_{yy}, marking the curvature of the isobaric plane, and pressure. With equal temperature gradients, the slope of the axis will be the larger, the smaller the curvature of the isobaric plane in the center of the baric system. Also such factors are discussed as give rise to a reduction in the axial slope of baric systems at various periods of development of such systems. For an example, a description is given of the cyclone over the European part of the USSR in the time from June 21 to 25, 1959. This example shows that the most striking reduction in the axial slope occurred during the first stage of the cyclonic development, at the time, before occlusion, at which the temperature contrasts did not change appreciably in the cyclonic center. Mention is made of the part played by curvature as one of the factors determining the axial slope of baric systems, and an example is offered to demonstrate this role with the comparison of the inclination angles of cyclonic and anticyclonic axes. Moreover, the axial slope of a baric system depends to a large extent on the pressure at the isobaric planes investigated. Formula (14) for the tangent of this inclination angle is written down in this connection. It is shown that the shift of

Card 2/3

BURTSEV, A.I.; LEONOV, N.G.

Calculation of cyclone movements based on the initial fields of pressure and winds. Trudy TSIP no.110:42-50 '61. (MIRA 14:6)
(Cyclones)

LEONOV, N.I.

Continents and "parts of the world". Izv. Vses. Geog. ob-va 89 no.2:118-122 Mr-Ap '57. (MLRA 10:6)
(Continents)

LEONOV, Nikolay Ivanovich, prof.; ROZENFEL'D, B.A., red.; RAKHLIN, I.Ye., red.; KRYUCHKOVA, V.N., tekhn.red.

[Scientific achievements of Samarkand astronomers in the 15th century] Nauchnyi podvig Samarkandskikh astronomov XV v. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1960. 117 p. (MIRA 14:3)

(Ulugh Beg Ibn Shahrukh, Mirza, 1394-1449)
(Astronomy, Arabic)

LEONOV, Nikolay Ivanovich; RATSEK, Vladimir Iosifovich; GIMMEL'FARB, N.S., red.; BAKHTIYAROV, A., tekhn. red.

[Across the Alai] Po Alaiu. Tashkent, Gos. izd-vo Uzbekskoi SSR, 1962. 135 p. (MIRA 15:6)
(Alay Range--Description and travel)
(Trans-Ili Ala Tau--Description and travel)

ACC NR: AR6035277 SOURCE CODE: UR/0169/66/000/009/D017/D018

AUTHOR: Leonov, N. I.

TITLE: Geophysical method of studying subsalt deposits on the eastern margin of the Caspian lowland .

SOURCE: Ref. zh. Geofizika, Abs. 9D114

REF SOURCE: Sb. Geofiz. issled. v Kazakhstane. Alma-Ata, Kazakhstan, 1965, 80-86

TOPIC TAGS: geophysics, geologic exploration, seismic prospecting, seismic station, gravimetric survey, geomagnetism, seismograph/GAK ZM gravimeter, SS 30/60 seismic station

ABSTRACT: Modern concepts on the tectonics, geological structure and formation time of the Caspian lowland are presented. The changes in reservoir properties of pre-kungur rocks are examined. The reason for seismic prospecting done by the reflected wave method and by the refracted wave method is explained. An SS-30/60 seismic station was used. The reflected seismic prospecting followed the single profiling system from one point of the explosion. The explosion spacing was 450 m,

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ACC NR: AR6035277

for prolonged 900 m travel tile curves, and in this case 2 explosion points were used. Groups of 3 seismographs per channel with parallel connection were used. The grouping base was 30 m, the distance between group centers was 15 m. The depth of the explosion in blue clay was 18—32 m; in quicksand it was 15—10 m; in Allian-Senaman sands on the dome caps it was 50—125 m. The average change was 13 kg. The working filtration was 45—60 cps. When registering quality deteriorated, the distance between the group centers was established at 7.5 m. During the refracted wave survey, the length of the travel time curves being 2.4—3.6 km, observations were carried out from 3—4 points of the explosion with 1.2—1.8 km between point. The working filtration was 0—25 cps and the average charge was 43 kg. Construction of the cuts was made by the t_0 methods, intersections, and "time fields". A detailed gravimetric survey was made simultaneously with two GAK-ZM gravimeters at a 450 m spacings. The mean square error of observations was 0.2 mgal. As a result of the seismic survey, conditional horizons, found to be identical with the base of the kungur formation and the Upper Carbon were defined. The horizons lie following an interval of 1200—1400 m, and dip west towards the center of the lowland, from 2.0—3.0, to 6.0—6.5 km. On the average, kungur horizons dip at an angle of 3 to 5 degrees with local layer flexures of a 300—400 m range (under the domes of Itasay 2, Oktyabrskiy, Kindysay, etc.). In the center of the Caspian lowland, subsalt reflections are traced under domes, but at the

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ACC NR: AR6035277

eastern margin of the lowland, they are traced only in the regions of interdome areas. The author explains this phenomenon by the homogeneous composition of salt nuclei in the center of the lowland and the presence of rewashed continental deposits on the periphery. Regional studies have shown that subsalt deposits on the eastern margin of the Caspian lowland lie at depths which can be reached by drilling. The need to combine gravimetric survey and high precision surface magnetic survey with seismic survey is indicated. I. Mokeyev. [Translation of abstract] [GC]

SUB CODE: 08, 17/

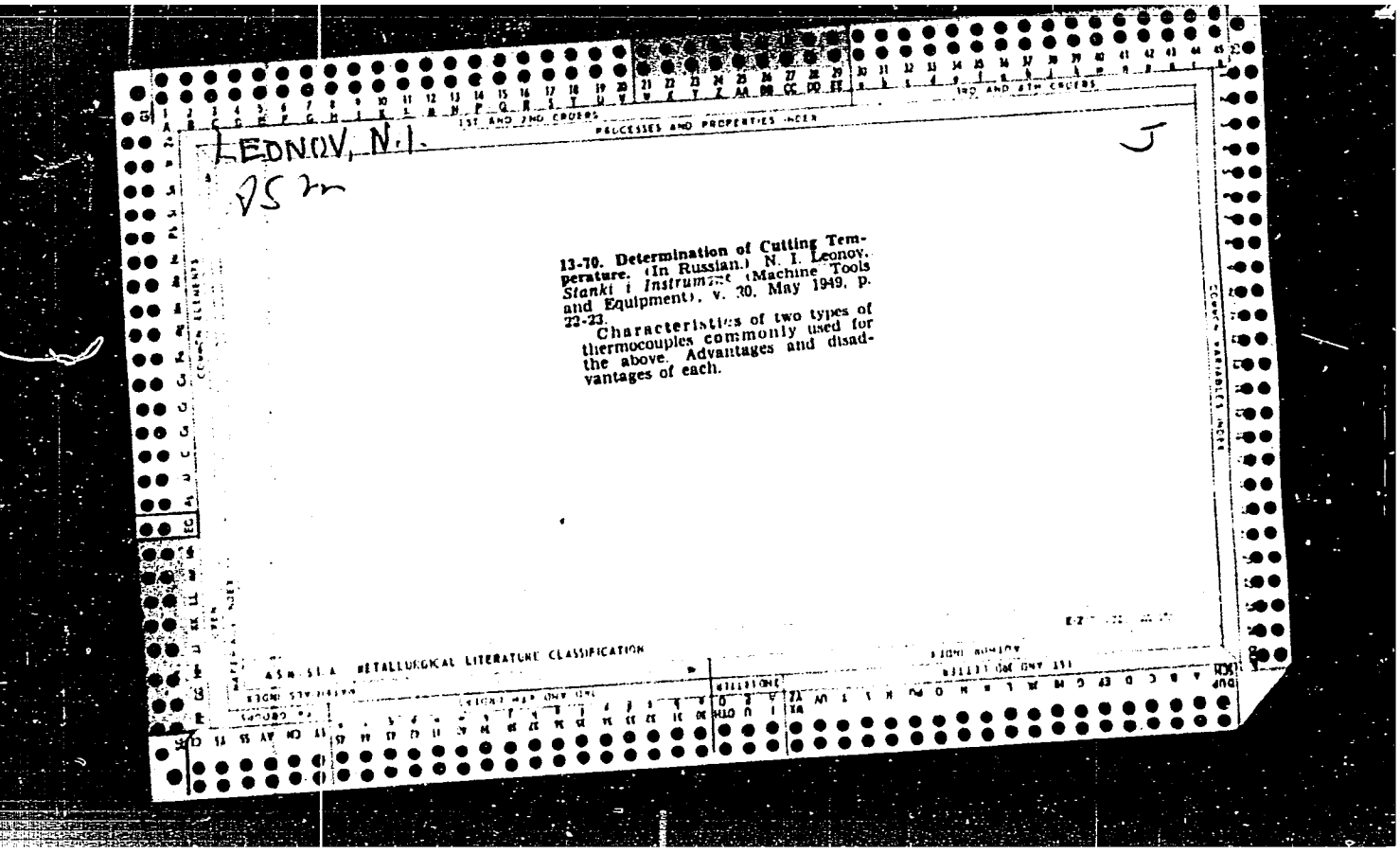
Card 3/3

Leonov, N. I. Cand. Tech. Sci.

Dissertation: "Investigation of the effect of the physical and mechanical properties of metals on processing them by cutting." 7 Feb 49

Moscow Order of Lenin Aviation Institute imeni Sergo Ordzhonikidze

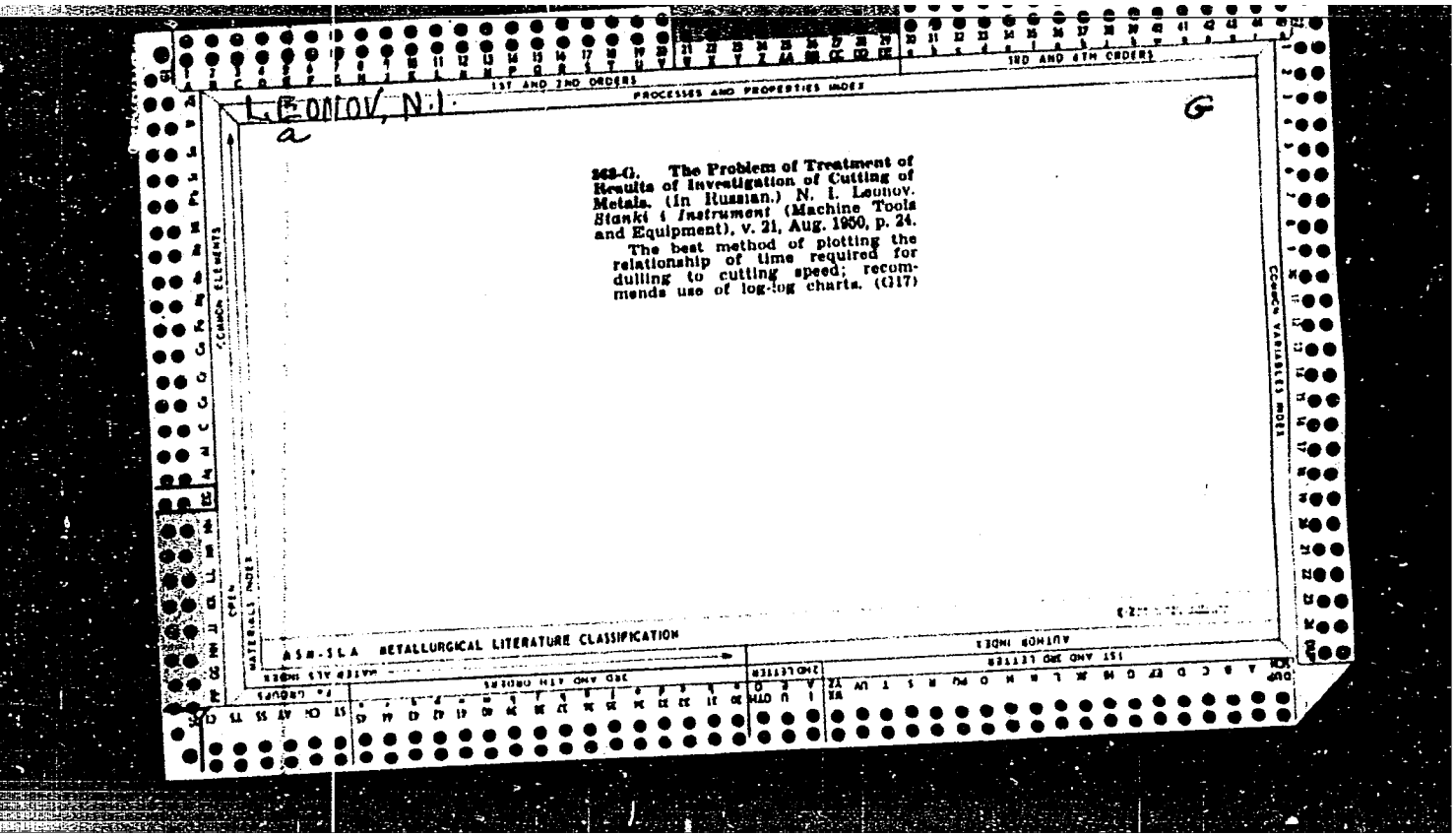
SO Vecheryaya Moskva
Sum 71



LEDNOV, N.I.

13-70. **Determination of Cutting Temperature.** (In Russian.) N. I. Leonov, *Stanki i Instrument* (Machine Tools and Equipment), v. 20, May 1949, p. 22-23.

Characteristics of two types of thermocouples commonly used for the above. Advantages and disadvantages of each.



143-G. The Problem of Treatment of Results of Investigation of Cutting of Metals. (In Russian.) N. I. Leonov. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, Aug. 1950, p. 24.

The best method of plotting the relationship of time required for dulling to cutting speed; recommends use of log-log charts. (G17)

LEONOV, N. I.

Ob izmerenii temperatur pri rezanii metallov. (Vestn. Mash., 1951, no. 2, p. 35-38)

DLC: TN4,V4

(Measuring temperatures during metal cutting.)

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

VINNIK, L.M.; GRINBERG, R.Ya.; KAMINSKIY, Ya.A.; KLEPIKOV, V.D.; KUZNETSOV, A.M.; KUCHENEV, N.I.; STRUZHESTRAKH, Ye.I.; TISHIN, S.D.; KHARITONOV, A.B.; TSEYTS, I.E.; SHAPIRO, I.I.; SHAPIRO, M.Ya.; ANAN'YAN, V.A., retsenzent; VASIL'YEV, D.T., retsenzent; GORETSKAYA, Z.D., retsenzent; KARTSEV, S.P., retsenzent; KEDROV, S.M., retsenzent; KOMISSARZHEVSKAYA, V.N., retsenzent; KOPERBAKH, B.L., retsenzent; KORBOV, M.M., retsenzent; LEONOV, N.I., retsenzent; LUR'YE, G.B., retsenzent; NOVIKOV, V.F., retsenzent; GAL'TSOV, A.D., red.; VOL'SKIY, V.S., red.; KHISIN, R.I., red.; SEMENOVA, M.M., red. izd-va; MODEL', B.I., tekhn.red.

[Reference book for establishing norms in the manufacture of machinery; in 4 volumes] Spravochnik normirovshchika-mashinostroitelia; v 4 tomakh. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry. Vol.2. [Establishing technical norms for operating machine tools] Tekhnicheskoe normirovanie stanochnykh rabot. Pod red. E.I.Struzhestrakha. 1961. 392 p. (MIRA 14:8)

(Industrial management) (Machine tools)

LEONOV, Nikolai Ivanovich.

With the reindeer herds; living conditions and work of the Samoyed reindeer breeders. 2. ed. Moskva, Rabotnik Prosveshchenila, 1927. 36 p. (Chital'nia sovetskoi shkoly, No. 1)

LEONOV, Nikolai Ivanovich.

In the forests of the Volga Region; how people live and how they earn their living in the forest belt of the USSR. Rabotnik prosveshcheniia, 1927. 52 p. (Chital'nia sovetskoi shkoly, No. 36-37)

LEONOV, Nikolai Ivanovich.

In the mountain valleys of the Altai. Life and livelihood among the Oirats. 3. ed. Moskva, Rabotnik prosveshcheniia, 1928. 50 p. (Chital'nia sovetskoi shkoly, No. 2-3)

LEONOV, Nikolai Ivanovich.

In the expanse of the steppes; how the Kirghiz (Kazaks) live and how they earn their living. Izd. 3. Moskva, Rabotnik prosveshcheniia, 1928. 59 p. (Chital'nia sovetskoi shkoly, No. 7-8)

LEONOV, Nikolai Ivanovich

The North under construction. Soviet construction among the minor nationalities in the Northern districts. Moskva, Vlast' sovetov, 1930. 71 p. (Biblioteka po natsional'nomu stroitel'stvu)

LEONOV, N.I. (President), SVINTSOV, P.M. (Member of the Commission on the Approbation of the "STI" Vaccine)

"Results of the application of the STI Vaccine for Prophylactic purposes in the period from January 1st to August 1942.

Veterinariya 19(11), 8-10. November 1942

(translation on microfilm 9007409)

State Commission on the Approbation of the STI Vaccine

LEONOV, Nikola Ivanovich

The work of veterinary hospitals. Moskva, Sel'khozgiz, 1945. 39 p/ (Peredovoi opyt v sel'skom khoziaistve)

LEONOV, N.I.

Co-author with V.A. Alikayev of "The Work of VIEV in the Years of the Patriotic War". VIEV, jointly with the Scientific Research Institute of Epidemiology and Hygiene of the Red Army and the State Scientific Control Institute of Veterinary Preparations of the [illegible], had approved and proposed for practical use the new anti-anthrax S.I vaccine. The specially organized, in 1941-1943, experiments with inoculations of 330,000 animals of various types with this vaccine have shown its high effectiveness (the work was organized and directed by director of VIEV, N.I. Leonov, professor F.A. Terent'yev, senior scientific coworker P.N. Dmitrov). By 1945 more than 5,000,000 animals had been in contact with the new vaccine, with extremely negligible losses among the vaccinated animals (from 0.0015 to 0.07%).

SO: Veterinariya; Vol. 23; No. 1;4-7; January 1946 uncl de s

Trans. # 326 by L. Lulich

extract

Analyst's note: Namesgiven in Rp-162-49, 21 Jun 1949, as W. A. Alikayev and N. I. LEONOV and the only identification as Veterinariya in 1946.

LEONOV, N. I.; PODDUBSKIY, I. V.

"Infectious Equine Encephalomyelitis and Measures for Controlling It"

Bolezni Loshadey (Equine Diseases), 1947
Compiled by A. Yu. Branzburg and A. Ya. Shapiro under Editorship of A. M. Laktionova, State Press for Agricultural Literature (Tab Con) p 5

U-5559 undated - 18 pages (see case)

LEONOV, N. I., MOLCHANOV, D. I., KUDRYAVTSEV, A. A. and RATNER, L. S.

"Study of the Infectiousness of Saliva in Foot-and-Mouth Disease on the Basis of a Physiolo ical Experiment". Veterinariya, 1947, No. 3.

LEONOV, N. I., Director
All-Union Inst. of Exptl. Veterinary Medicine.
"The Session of the International Epizcotic Bureau."
SO: Veterinariia 24(1), 1947, p. 42. (Tab Con)

LEONOV, N. I.

Doc. Veterin. Sci.

Dissertation: "Active Immunization in a Case of Bird Pseudoplague."

3 Jun. 49

Moscow Veterinary Academy

SO Vecheryaya Moskva
Sum 71

LEONOV, M. I.

33383. Problema Spetsificheskoy Profilaktiki Infektsionnykh Bolezney Zhivotnykh Sov. Zootekhniviya, 1949, No. 6, s. 37-41.

SO. Letopis' Zhurnal'nykh Statey, Vol. 45, Moskva, 1949

LEONOV, N.I., Director
All-Union Institute of Experimental Vet. Medicine
"The problem of specific prophylaxix of infectious diseases of animals."
SO: Vet. 26 (10) 1949, p. 11

LEONOV N. I

LYEONOV, N. I.

30442

K ztiologii, patogyenyeeu, klinikye I diffyeryents ialvnoy diagnostikye otitov u porosyat. Vyetyerinariya, 1949, No 10, S. 25-27.

SO: Letopis' No. 34

Leonov, N.I.

LEYONOV, N. I.

MIKHIN, N. A. and LEYONOV, N. I.

Course in Veterinary Microbiology, Particular microbiology, Tbilisi, Georgian State Medical Press, 1950, 438 pages with illustrations, 11 rubles 10 kopeks, Bound, Copies --1,500. In Georgian. Text for higher veterinary institutions and faculties.

SO: [redacted] U-4724, Sept. 30, 1953, [redacted] (Veterinaryiya, No. 4, April 1951, pp. 60-61, Moscow.)

LEONOV, N. I. (Prof.)

"A New Stage in the Development of Microbiology and Immunology"

Nauka i Zhizn', No. 5, 1950
-W-12655 7 Aug 1950 (see case)

LEONOV, N. I.

"New Horizons in Science" (Concerning Contemporary Microbiology)

Oktyabr' 1950, No. 6 pp 134-145
-W-24635 3 Dec 1952 p 6

LEONOV, N. I.

"A New Stage in the Development of Microbiology" (Concerning G. M. Eosh'yan's Book On the Nature of Viruses and Microbes, an Account of a Lecture to the Scientific-Methods Conference of Workers in Higher Institutes of Learning of the Ministry of Agriculture), Trudy Mosk Vet Akademii (Works of the Moscow Veterinary Academy), 1950, Issue 7, pp 315-323

-W-24635 3 Dec 1952 p 6

LEONOV, N.

"The Nature of Invisible Creatures" (About the Discoveries of G. M. Bosh'yan)

Smena (Change), No. 12, 1950 pp 10-11
AI-24635 3 Dec 1952 p 6

LEONOV, N.I.

ALIKAYEV,V.A. and LEONOV,N.I.

Alikayev, V.A. and N.I. LEONOV, "The Fight Against Diseases of Animals." Translated by Ya. Pluks, Riga. Latgosizdat, 1951. 192 pages with illustrations. Price 3 rubles, 90 kopeks. 3,000 copies. In Latvian.
SO:Veterinariya;January 1952 uncl de g
Trans. # 155 by L.Lulich

LEONOV, N. I. (Prof.)

"New USSR Developments in Tissue Therapy"

Nauka i Zhizn', Vol. XVIII, No. 8, 1951 pp 17-19
M-21498 20 Feb 1952 (see case)

USSR/Biology - Agriculture Apr 52

Medicine - Veterinary Science

"Agricultural Science in the German Democratic Republic," Prof N. I. Leonov

"Nauka i Zhizn'" No 4, pp 42, 43

Describes his attendance on 17 Oct 52 at Berlin of the opening of one of the representatives sent by the capacity of one of the representatives sent by the All-Union Acad Agr Sci imeni V. I. Lenin. Mentions the Inst of Potato Growing at Gross-Lueswitz, where work on combating the Colorado beetle, which was allegedly spread over East Germany from US planes. Describes visit to the Institute on the Study of Virus Diseases of Animals is being carried out. Describes research on on the Island of Riems, referring to research on vaccines against foot and mouth disease being carried on there, and stating that large quantities of the plague, and equine infectious anemia are being vaccine against foot and mouth disease. States that G. M. Boshyan and G. I. Rozhkov's views on the spread of equine infectious anemia have been confirmed by results obtained at Riems. Stresses cooperation and contacts between East German and USSR scientists.

221T5

LEONOV, N. I., Prof.

See also -B-63027 - in case
25 March 1953

1. LEONOV, N. I., Prof.

2. USSR (600)

4. Stock and Stockbreeding

7. Program of abundance.
Nauka i zhizn' 19 No. 11, 1952

9. Monthly Lists of Russian Accessions, Library of Congress, March 1953, Unclassified.

LEONOV, N.I., professor.

Academy of Agricultural Sciences in Czechoslovakia. Nauka i zhizn' 20 no.4:39 Ap '53. (MLRA 6:5)

(Czechoslovakia--Agriculture)

LEONOV, M. I.

"On the material of the XV International Veterinary Congress" [Stockholm, Sweden, Aug 9-11]

So: Veterinariya, Vol. 30, No. 12, December 1953 Uncl.
Trans. 462 by L. Lulich (21-page translation filed in case of M. I. LEONOV)

LEONOV, N.I.

USSR/Medicine - Veterinary FD-1294

Card 1/1 : Pub 137-14/20

Author : Leonov, N. I.

Title : Erroneous generalizations. Concerning the book of S. N. Muromets on "Variability of Microorganisms and the Problem of Immunity." Sel'khozgiz, 1953, 237 pages

Periodical : Veterinariya, 8, 53-57, Aug 1954

Abstract : This book consists of compilation of material selected from many sources which illustrate some basic views of immunity and variability of microbes. The author of the book, S. N. Muromets, contributes very little of his own since he never conducted any systematic research himself. He bases many of his dogmatic and presumtuous conclusions on the work of G. M. Bosh'yan. As is known, G. M. Bosh'yan's work was severely criticized by many Soviet scientists. The very first chapter of the book "Species Forming Variability of Microorganisms" contains references to abstract reasoning of V. S. Dmitriyev. Dmitriyev's theory on formation of plant species was offered without any experimental support and was criticized by N. S. Khrushchev at the Plenum of the Central Committee of the CPSU.

Institution :

Submitted :

USSR/Farm Animals. Swire. Q-2

Abs Jour: Ref Zhur - Biol., No. 22, 1958, 101183

Author : Leonov, N.I., Pivnyak, I.G., Obraztsova, A.S.

Inst : All-Union Scientific Research Institute of Animal Husbandry.

Title : Studying the Effective Utilization of Biomycin and Its Dry Waste in Meat Fattening of Swine.

Orig Pub: Byul. nauchno-tekhn. inform. Vses. n.-i. in-t zhivotnovodstva, 1957, No. 2 (4), 19-21

Abstract: When swine received 140 g of dry biomycin waste per each kg of live weight for a period of 4 months with their daily rations, they showed weight gain increases of 16-18 percent, and a 6 percent better utilization of fodder as compared to controls which did not receive antibiotics.

Card 1/1

LEONOV, N. I.

AUTHOR: Leonov, N.I., Professor 25-8-7/42

TITLE: Stimulus of Productivity (Stimulyatory produktivnosti)

PERIODICAL: Nauka i Zhizn', 1957, # 8, pp 15-16 (USSR)

ABSTRACT: The addition of antibiotics to the fodder given to domestic animals resulted in an increase in weight within a short period, and has been especially useful when applied with regard to young live-stock. This influence of antibiotics on the growth of the animals was studied and tested by Professors Z.V. Yermol'yeva, A.Kh. Sarkisov, and I.Ye. Mozgov among others. Tests carried out at the Kunzevskaya poultry farm, at the "Shugarovo", "Petrovskoye", sovkhozes and others, showed that the addition of penicillin and biomycin (about 15-20 milligrams per kilogram of concentrated fodder) increased the weight of chickens and young pigs by 10-15%. Thus the fattening period is shortened considerably. Because pure biomycin is still too expensive to be used for such purposes, the residue resulting from the production of biomycin is applied in larger quantities.

In November 1956, the USSR Ministry of Agriculture held a special conference, where famous scientists and Member-Correspondents of the USSR Academy of Sciences, A.A. Imshenetskiy and

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Stimulus of Productivity 25-8-7/42

N.A. Krasil'nikov, Professors A.Kh. Sarkisov, Z.V. Yermol'-yeva and Ya.Ye. Kolyakov, and Academician of the VASKhNIL, I.Ye. Mozgov, dealt with the application of antibiotics in stock-farming. The best results in this field were achieved by adding 10-20 grams of antibiotics to every ton of fodder, accounting for a weight increase of 15-20%, in comparison with animals not being fed antibiotics.

The addition of antibiotics to the fodder might have a negative effect on the organism as well. The studies with regard to this problem have not yet been completed. Other microbes can have the same effect, for example, those contained in yeast. At a conference on the application of antibiotics, Professor Z.V. Yermol'yeva dealt with the stimulant effect brought about by the "theaceae fungi" resulting from the common existence of acetic fermentation of bacteria and yeast.

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Card 2/2

LEONOV, N.I.

AUTHOR: None Given

25-1-2/48

TITLE: Our Guests (U nas v gostyakh)

PERIODICAL: Nauka i Zhizn', 1958, # 1, pp 2-6 (USSR)

ABSTRACT: At the invitation of the editorial staff, various Soviet scientists expressed their opinions as to the future development of the USSR. Academician-Secretary D.I. Shcherbakov of the Geological-Geographical Department of the USSR Academy of Sciences pointed to the imminent exploitation of new oil resources in the Caucasus and a region adjacent to Turkmenia, to the opening up of vast resources of cyanite on the Kola peninsula, and to the unlimited iron ore deposits of the Kursk magnetic anomaly.

Member-correspondent B.N. Petrov of the USSR Academy of Sciences stressed the importance of achieving automation of the technological process as a whole and not of individual units and operations alone.

Member-correspondent T.S. Khachaturov of the USSR Academy of Sciences, Director of the Institute of Complex Transportation Problems, spoke of the electrification of Soviet railways. In the USSR during the next 15 years, 40,000 km of railways will be electrified. N.I. Garbar, Head of the

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Our Guests

Technical Administration of the Ministry for Chemical Industry, gave a talk on the importance of chemical science in modern industry and of the introduction of new plastics into various industries. One of the top-quality plastics is fluoroplast-4 (teflon). It is not even affected by boiling aqua regia. Recently new products like synthetic rubber, isoprene rubber, chlotoprene rubber (nitrogen-resistant), silico-organic rubber (heat-resistant) and fluorine rubber (approaching teflon in quality) have been developed by Soviet scientists. The output of synthetic fiber products, such as kapron, nylon, lavsan, anid, chlorin, enait, etc, will be considerably increased.

Member-correspondent L.O. Bumazhnyy of the Academy for Architecture and Building Construction, discussed the housing problem in the USSR, which will be solved within the next 10 - 12 years. Professor N.I. Leonov devoted his talk to the most important aim of the Soviet economy - to catch up with and to surpass the USA in the production of meat, milk and butter.

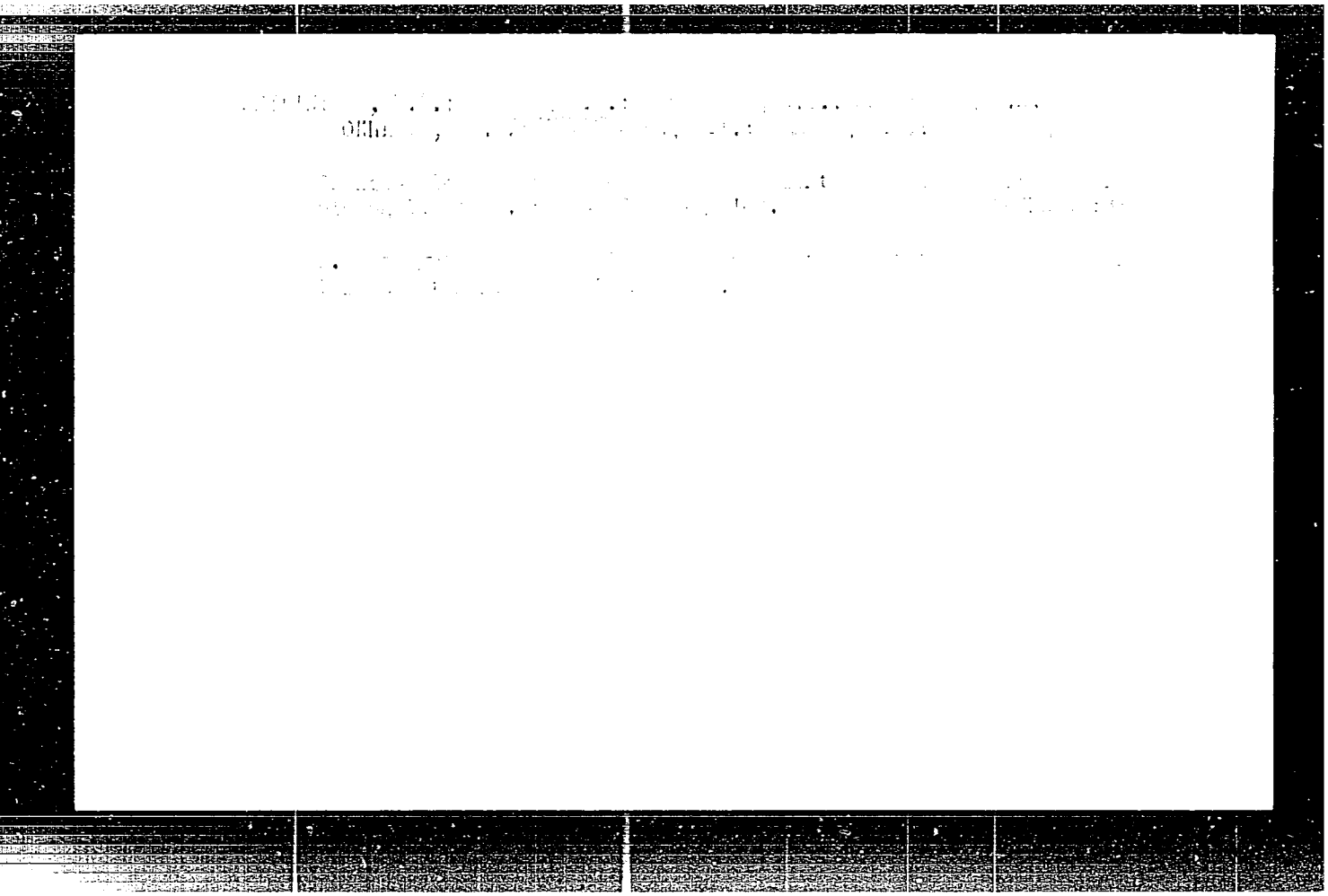
There are 7 photographs.

AVAILABLE: Library of Congress

Card 2/2

LEONOV, N.I.; SKRYABIN, G.K.; SOLNTSEV, K.M.; BRUSANOV, N.A., red.; DEYEVA, V.M., tekhn. red.

[Antibiotics in animal husbandy]Antibiotiki v zhovotnovodstve. Moskva, Sel'khozizdat, 1962. 231 p. (MIRA 15:10)
(Stock and stockbreeding) (Antibiotics)



APPROVED FOR RELEASE: 07/12/2001 CIA-RDP86-00513R000929230004-2"

LEONOV, N.I.

"The lower reaches of the Amu Darya, Sarykamysh and Uzbov; history of formation and settlement." Materials of the Khorezm Expedition. Reviewed by N.I. Leonov. Izv. Vses. geog. ob-va 94 no.4:353-354 Jl-Ag '62. (MIRA 15:9)

(Amu Darya Valley)

TURUSHEV, V.A., aspirant; LEONOV, N.I., nauchnyy rukovoditel' raboty, prof.

Change in the anyagonistic activity of Escherichia coli and Staphylococcus under the effect of terramycin. Veterinariia 42 no.12:14-16 D '65. (MIRA 19:1)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zhivotnovodstva.

LEONOV, Nikolay Maksimovich; LYAPTSEV, N., red.

[Synthetic materials in the national economy] Sinteticheskie materialy v narodnom khoziaistve. Sverdlovsk, Sverdlovskoe knizhnoe izd-vo, 1963. 34 p.
(MIRA 17:8)

LEONOV, N. N.

AUTHORS: Boyarinov, V. S., Leonov, N. N. (Gor'kiy)

TITLE: On the Theory of a Relay System (K teorii odnoy releynoy sistemy)

PERIODICAL: Avtomatika i Telemekhanika, 1958, Vol. 19, Nr 2, pp. 114-134 (USSR)

ABSTRACT: Pointing at the insufficiencies and incorrectness of the works by Flügge-Lotz and Klotter (References 2 - 4) the authors investigated one of the models of relay systems of the same order, also investigated by Flügge-Lotz and Klotter, according to the method of the point-by-point transformation of a straight line into another straight line (Reference 5) with various types of relay characteristics. With sufficient idealization the theory of a series of relay systems of the second order, in which an effect not only according to the coordinate but also according to its first derivation is considered, can be traced back to the investigation of this theoretical model. Examples of such systems are: cross-stabilizi systems in a plane with V-shaped wing arrangement, stabiliz

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system of the longitudinal motion with a constant angle of application in a rocket when its inertia is being neglected. The system is expressed by a non-linear differential equation

$$\ddot{x} + 2h\dot{x} + x = F(\psi), \qquad \psi = x + k\dot{x}$$

with certain given (Figure 1) relay characteristics. h denotes any positive number (in References 2 - 4 there is $0 < h < 1$). k may have any sign. For this system an intensive investigation of the two-dimensional phase space is carried out by means of the diagrams of Kenigs-Lemeray, and specially, new data on the number and stability of limit cycles are obtained in comparison to those existing in technical publications. The parameter space was here divided into sections with similar reaction of the dynamic system in a qualitative respect. Chapter 1 : "The case of a constant spatial lagging" was written by N. N. Leonov. Chapter 2 : The case of a relay Characteristic with an insensitive zone" was written by V. S. Boyarinov. In chapter 1 - two cases are investigated: Relay characteristics of form A and those of form B. In the case A the phase space of the system is formed by two half-planes partly placed on each other which are connected with each

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other along the sections at the straight lines $\psi = \delta$ and $\psi = -\delta$. When the point describing the motion of system meets with these straight lines the relay is switched over and the point passes to the other half-plane. It is shown that in the case of the characteristics of form A the system, in dependence on the parameters and the initial conditions will either tend toward the state of equilibrium (1, 0) or (-1, 0) or that it will produce self-oscillations. - When the relay characteristic has the form B the point will in any case tend toward the stable limit cycle at $\delta < 1$. In all other cases (characteristics A and B at $\delta > 1$), in spite of the stable limit cycles, the representing point (izobrazhayushchaya tochka) is not secured with corresponding perturbances against hitting within the zone of attraction of special points. In chapter 2 - the characteristic of the non-linear element is assumed to be of form C (Figure 1). The phase space is divided into three domains G_1, G_2 and G_3 which are connected with each other at the lines $\psi = \delta$ and $\psi = -\delta$. The solution consists of the investigation of several linear differential equations with a subsequent

"adjustment" of the integration constant, starting from the continuity demand for x and y in the point of interruption of the right part of the differential equation system (21) describing the system. Such an adjustment is here carried out at the straight lines $\psi = \pm \delta$. - Last the case where the relay characteristics has the form D (Figure 1) is investigated. Also here the investigation consists of point-by-point transformation of the straight line within itself. There are 16 figures, and 8 references, 3 of which are Slavic.

SUBMITTED: March 19, 1957

AVAILABLE: Library of Congress

1. Relay systems-Mathematical analysis

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9,3260

AUTHOR: Leonov, N.N.

TITLE: Point Transformation of a Straight Line Into a Straight Line

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 6, pp 942 - 956 (USSR)

ABSTRACT: The investigation of various oscillatory systems encountered in radio-electronics and automatic controls is usually equivalent to the investigation of a line-to-line point transformation (Refs 1-5). The method was devised and first applied to the theory of automatic control by A.A. Andronov and his collaborators (Refs 1, 2, 6, 7). A further investigation of the method is given in this paper. The results are stated in a number of theorems. It is assumed that the point transformation of a straight line into a straight line is represented by $\bar{x} = f(x)$, where $x \in (a, b)$. The first theorem states that if $f(x)$ is a continuous function increasing in the interval (a, b), the line-to-line transformation T contains only simple fixed points of "interlacing" stability. The second theorem shows that, if $f(x)$ is a continuous function decreasing

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Point Transformation of a Straight Line into a Straight Line

in the interval (a, b), the transformation T can have not more than two identical fixed points and not more than one simple fixed point. The third theorem states that if points b_i and a_j divide the interval (a, b) into intervals (σ_{k-1}, σ_k) and if $f(x)$ satisfies the inequality $\sigma_{k-1} < f(x) < \sigma_k$ in the interval (σ_{k-1}, σ_k), the transformation T can only possess simple fixed points. The fourth theorem says that if $f(x)$ is such that $f[f(x)]$ satisfies the conditions of the third theorem, the transformation T can have fixed points which can only be identical in pairs. Theorem 5 shows that if the transformation T consists of successive transformations T_1 and T_2 (which are defined by Eqs (2.1) and (2.2)) and if it is such that $x = T_2T_1x$ and has a m-ple root at $\mu = 0$, the transformation T possesses a complex cycle which at sufficiently small μ can be split into not more

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than m cycles of "interlacing" stability. For an even m the number of cycles is even and the number of stable cycles is equal to the number of the unstable ones. For an odd m the number of cycles is odd and exceeds by one the number of the stability cycles of the generating cycle. Theorem 6 shows that if T consists of successively applied transformations T_1 and T_2 (Eqs 2.1 and 2.2) and is such that the $x = (T_2T_1)^2x$ and has an n-ple root at $\mu = 0$, T has a complex double cycle at $\mu = 0$; the cycle can be split into one double cycle and $n-1$ quadruple cycles at sufficiently μ. The cycles of different stability are "interlaced". Theorem 7 states that if the transformation T depends on the parameters μ and at $\mu = 0$ has an m-ple fixed point M^*, such that $M^* = T^m$ has a n-ple root, the point M^* at small μ is split into not more than n, m-ple fixed points of the transformation T. For even n the number of fixed points is even and the number of stable points is equal to the number of unstable ones.

Card3/4 Theorem 8 shows that if the transformation T depends on

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Point Transformation of a Straight Line Into a Straight Line

the parameters μ and at $\mu = 0$ has an m-ple fixed point M such that its characteristic root is equal to -1, M is split into not more than one n-ple fixed point and n-1 double m-ple fixed points (for sufficiently μ). The fixed points of different stabilities are interlaced. The discontinuous line-to-line transformation by means of a broken straight line is also considered. The transformation is defined by Eqs (3.1). The bifurcation problem of this transformation is also investigated. The procedure is illustrated in Figures 1-6. There are 6 figures and 15 references, 1 of which is French, 1 German and 13 are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-tekhnicheskiy institut pri Gor'kovskom universitete (Scientific-research Physics-engineering Institute of Gor'kiy University)

SUBMITTED: June 30, 1959

80133

16.9500 S/141/59/002/06/015/024
E192/E382

AUTHORS: Neymark, Yu.I., Gorodetskiy, Yu.I. and Leonov, N.N.

TITLE: Investigation of the Stability of Some Distributed Linear Systems

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 6, pp 967 - 988 (USSR)

ABSTRACT: The following dynamic system is considered. The output variable $y(t)$ is uniquely determined by the input function $x(\tau)$ for $\tau \leq t$. The set of operations necessary for the functions $x(t)$, in order to obtain $y(t)$, is the operator of the system. If the operator is linear the system is also linear. The dynamic system is said to be stable if small input perturbations result in small perturbations at the output. In order to make this definition clearer it is necessary to have quantitative characteristics of the input and output perturbations. If the characteristics of the input and output are denoted as r and ρ, the stability requirement states that for $\varepsilon > 0$, ρ_y should be smaller than ε if $r_x < \delta$, where $\delta > 0$ and is independent of ε. It is assumed that the input and output variables $x(t)$

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Investigation of the Stability of Some Distributed Linear Systems

and $y(t)$ can undergo Laplace transformations and that the relationship between them can be expressed by:

$$y(p) = K(p)x(p) \qquad (1.1) .$$

It is known that from the condition expressed by Eq (1.2) it follows that the transformation $F(p)$ of the function $f(t)$ is an analytic function of p in the semi-plane $\mathrm{Re}\, p > \sigma$ and that for an arbitrary $\sigma' > \sigma$, it is possible to write:

$$rf = \int_0^\infty |f|^2 e^{-2\gamma t} dt , \quad \rho f = \int_0^\infty |f|^2 e^{-2\sigma' t} dt \qquad (1.5) .$$

If $rf = \rho f$, the following theorem is true: "In order that a linear system be stable with respect to all the perturbations $x(t)$, for which $\rho x < +\infty$, it is necessary that the function $K(p)$ should be analytical for $\mathrm{Re}\, p > \gamma$

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Investigation of the Stability of Some Distributed Linear Systems

and it is sufficient for the function to be analytical in any semi-plane $\mathrm{Re}\, p > \gamma'$ where $\gamma' < \gamma''$. A further theorem states the following: "In order that the linear system be stable in the sense:

$$r_f = \mathrm{Sup}_{t>0} e^{-\gamma t} \left| f(t) \right| , \quad \rho_f = \mathrm{Sup}_{t>0} e^{-\Gamma t} \left| f(t) \right| \qquad (1.7)$$

for $\Gamma = \gamma$ it is necessary that the system should be stable in accordance with Eqs (1.5) at $\Gamma = \gamma$ and it is sufficient that the function $K(p)$ should be analytical in any semi-plane $\mathrm{Re}\, p > \gamma'$ for $\gamma' < 0$ and that the integral:

$$\int_{-\infty}^{+\infty} \left| \frac{dK}{dp} \right|^2_{p=i\omega} d\omega \qquad (1.8)$$

should be convergent. A system described by :

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Investigation of the Stability of Some Distributed Linear Systems

$$\frac{\partial^2 u}{\partial t^2} - a\frac{\partial^2 u}{\partial x^2} - b\frac{\partial u}{\partial x} - c_1 u = f_o(u) \qquad (1.9)$$

$$\frac{d\xi_i}{dt} - \sum_{s=1}^{n} a'_{is}\xi_s = f_i(\xi_1, \xi_2, \ldots, \xi_n) \qquad (i = 1, 2, \ldots, n-2) \qquad (1.10)$$

is considered as a general example. The system can be linearized and the equations are then written as Eqs (1.11) and (1.12). If it is assumed that the initial conditions are 0 , Eqs (1.11) and (1.12) can be written as Eqs (1.13) and (1.14). The solution of this system can be written as:

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$$\underline{B} = K(p)\underline{A} \qquad (1.16)$$

Investigation of the Stability of Some Distributed Linear Systems

where A and B are vectors and K(p) is expressed by the matrix given by Eq (1.17). It is shown that the solution of the stability problem is equivalent to the investigation of the roots of the so-called characteristic equation; this is expressed by $\Delta(p) = 0$. The above theoretical results are employed to investigate the stability of several systems. First, the so-called problem of I.N. Voznesenskiy is considered. The system is described by Eq (2.1). It is shown that its characteristic equation is in the form of Eq (2.7). Secondly, a feedback amplifier containing a lossy delay line in the feedback loop is investigated. The characteristic equation of the system is in the form of Eq (3.1), where J(p) is the transfer function of the feedback loop. The stability of an automatic compressor station operating between input and output mains of a gas supply system is investigated. The operation of this system is described by Eqs (4.1), (4.2) and (4.3) A temperature controller is also considered. The operation is

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Investigation of the Stability of Some Distributed Linear Systems

of the system is described by Eqs (5.1) and (5.5). There are 11 figures and 24 references, 1 of which is English and 23 are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-tekhnicheskiy institut pri Gor'kovskom universitete (Scientific-research Physics-engineering Institute of Gor'kiy University)

SUBMITTED: July 2, 1959

Card 6/6

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16.3400 16.9500(1132,1344,...) E031/E335

AUTHOR: Leonov, N.N.

TITLE: On Discontinuous Piecewise Linear Point Transformations of a Straight Line Into a Straight Line

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 3, pp. 496 - 510

TEXT: The space of the parameters of the transformation is divided into regions of existence of stable fixed points of different multiplicities and types. In the space of parameters, domains of existence of non-periodic, stable (in the Poisson sense) motions of the corresponding dynamical systems are also determined. The transformation considered is:

$$\bar{x} = \Pi x = \begin{cases} T_1 x = a + \lambda_1 x & (x \text{ negative}) \\ T_2 x = b + \lambda_2 x & (x \text{ positive}) \end{cases}$$

In an earlier paper (Ref. 7) the existence of stable fixed points of the transformation was solved for the case a positive, b negative. The following cases are considered here:

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1) $0 < \lambda_1 < 1$, $\lambda_2 > 1$; 2) $\lambda_1 < 0$, $\lambda_2 > 1$; 3) $\lambda_1 > 1$, $\lambda_2 > 1$; 4) $\lambda_1 > 1$, $0 < \lambda_2 < 1$; 5) $\lambda_1 > 1$, $\lambda_2 < 0$. The cases 4 and 5 can be reduced to cases 1 and 2 and so are not considered further. Case 1 occupies by far the greater part of the paper and case 3 is dealt with very briefly. The domain of the space Λ corresponding to the first case is divided into three regions: Λ_{1a} for which $T_1 b \geq x_2^*$ (the $*$ indicates a fixed point); Λ_{1b} for which $a \leq x_2^*$; and the domain Λ_{1c} for which $a \geq x_2^* \geq T_1 b$. Consider the second domain. The transformation has a unique simple fixed point and the problem of determining multiple fixed points arises. Among the $(n+1)$-ple fixed points, those which are simple fixed points of the transformations $T_1^n T_2$ and $T_1 T_2^n$ are discussed first.

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The corresponding regions of stable fixed points define a domain Λ^*. The existence of stable fixed points in this domain and in the domain $\Lambda^*_{16} = \Lambda_{16} - \Lambda^*$ is discussed. Next the case of multiple fixed points which are simple fixed points of the transformations $T_1^m T_2^n$ and $T_2^n T_1^m$ are considered. Three transformations R_1, R_2 and R_3 are defined in the cases $T_1 b > 0$, $T_2 a < 0$ and $T_2 a > 0$, respectively. The conditions under which these transformations can have stable fixed points is discussed. Finally, the domain Λ_{1c} is analysed. The following conclusions are reached for case 1: for each λ_2, a/b, λ_1 such that the point λ_2, a/b, λ_1 belongs to Λ^* the transformation Π either has a unique stable cycle or the representative point describes non-periodic motion which is stable in the Poisson sense. If the point λ_2, a/b, λ_1 belongs

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to Λ_{1a}, all motions send the representative point off to infinity. In Λ_{1b} there are domains for which Γ has no stable cycles but there are non-periodic motions stable in the Poisson sense. In Λ_{1c} there are domains where all motions, with the exception of a set of unstable cycles and non-periodic motions, are stable in the Poisson sense, and send the representative point off to infinity. In case 2, three domains Λ_{2a}, Λ_{2b}, Λ_{2c} are distinguished. The conclusions reached are as follows: if the point $\lambda_2, a/b, \lambda_1$ belongs to Λ_{2b}, Γ can have one or two stable cycles, or can have no stable cycles while the representative point can describe non-periodic motions which are stable in the Poisson sense. If the point $\lambda_2, a/b, \lambda_1$ belongs to Λ_{2a} all motions

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send the representative point off to infinity. In Λ_{2c} there are domains in which there exist a stable cycle for Γ which is unique for each point $\lambda_2, a/b, \lambda_1$ and also domains where all motions, with the exception of a set of unstable cycles and non-periodic motions which are stable in the Poisson sense, send the representative point off to infinity. In case 3, Γ has no stable fixed points. There are 6 figures and 9 Soviet references.

ASSOCIATION: Nauchno-issledovateel'skiy fiziko-tekhnicheskiy institut pri Gor'kovskom universitete (Scientific Research Institute of Physics and Technology at Gor'kiy University)

SUBMITTED: November 27, 1959

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9.2586

AUTHOR: Leonov, N.N.

TITLE: The Theory of Discontinuous Transformation of a Straight Line Into a Straight Line

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 5, pp. 872 - 886

TEXT: The application of the method of the point transformations to the investigation of dynamic systems sometimes necessitates investigation of a discontinuous transformation of a straight line into a straight line. Such a problem can be encountered in the synchronisation of a multivibrator by a periodic train of pulses (Ref. 3). In the following it is assumed that the transformation has one discontinuity and it is described by:

$$x = \Pi x = \begin{cases} T_1 x = a + \lambda_1 x & (x < 0) \\ T_2 x = b + \lambda_2 x & (x > 0) \end{cases} \qquad (1) .$$

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In the author's earlier works (Refs. 1, 2) the cases when the Π-transformation had no simple fixed points or had only simple fixed points were investigated for $a > 0$ and $b < 0$. The remaining cases (I) $ab > 0$ and (II) $a < 0$, $b > 0$ are considered. The possible values of the parameters λ_1 and λ_2 are determined by the following intervals:

1) $0 < \lambda_1 < 1$, $0 < \lambda_2 < 1$; 2) $0 < \lambda_1 < 1$, $\lambda_2 > 1$;

3) $0 < \lambda_1 < 1$, $\lambda_2 < 0$; 4) $\lambda_1 > 1$, $0 < \lambda_2 < 1$;

5) $\lambda_1 > 1$, $\lambda_2 > 1$; 6) $\lambda_1 > 1$, $\lambda_2 < 0$;

7) $\lambda_1 < 0$, $0 < \lambda_2 < 1$; 8) $\lambda_1 < 0$, $\lambda_2 > 1$; 9) $\lambda_1 < 0$, $\lambda_2 < 0$.

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The transformation Π is characterised by three parameters: λ_1, λ_2 and $\Delta = |ab^{-1}|$. The space of these parameters is denoted by Λ. It is now necessary to determine in the space Λ the regions for which the types of motion of the mapping point are quantitatively different and, in particular, to determine the regions of existence of the stable cycles of transformation Π. In view of the fact that the roots of the characteristic equation of the transformation Π^n are identical for all the points of an n-term cycle, it is sufficient to consider only one point for each cycle. It should also be said that the cases (I) $a < 0$, $b \leq 0$ and (II) 4, 7, 8 can be reduced to the cases (I) $a > 0$, $b > 0$ and (II) 2, 3, 6 by making the following substitution:

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$$x = -y,\ \bar{x} = -\bar{y},\ \lambda_1 = \alpha_2,\ \lambda_2 = \alpha_1,\ a_1 = -b,\ b_1 = -a \qquad (2)\ .$$

Consequently, it is necessary to investigate only the cases (I) $a > 0$, $b > 0$ and (II) 1, 2, 3, 6, 9. Only the most complicated cases, when the values of λ_1 and λ_2 belong to the intervals 3, 6 and 9 are considered. For the case I. 3 ($0 < \lambda_1 < 1$, $\lambda_2 < 0$) the transformation Π has a single simple fixed point x_2^*. The infinity is unstable and all the movements take the mapping point into the limited region $(T_2 a, a)$ if $\Delta > 1$ or into the region $(T_2 b, b)$ if $\Delta < 1$. In the case I. 6 ($\lambda_1 > 1$, $\lambda_2 < 0$), the transformation Π has two simple fixed points in the

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space Λ ; these points are $x_1^* = a(1 - \lambda_1)^{-1}$ and $x_2^* = b(1 - \lambda_2)^{-1}$. The fixed point x_1^* of the transformation T_1 is unstable and the point x_2^* of the transformation T_2 is stable if $\lambda_2 > -1$ and stable for $\lambda_2 < -1$. The transformation Π has also a single simple fixed point x_2^* for the case I. 9 ($\lambda_1 < 0$, $\lambda_2 < 0$) . If $\lambda_2 > -1$, the point x_2^* is stable and the transformation Π can have only two double points x_{11}^* and $T_2 x_{11}^*$ which form a two-term cycle. If these are stable (which occurs at $\lambda_1\lambda_2 < 1$) their existence region is defined by the condition $\Delta > -\lambda_2^{-1}$; on the other hand, if they are unstable ($\lambda_1\lambda_2 > 1$) the

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condition is $\Delta < -\lambda_2^{-1}$. For the case II. 9 ($\lambda_1 < 0$, $\lambda_2 < 0$) the transformation Π has two simple fixed points x_1^* and x_2^* . If $\lambda_1 > -1$ and $\lambda_2 > -1$ the two points are stable and the whole axis x is split by the separatrices directed towards the discontinuity point of the transformation Π . If $\lambda_1 < -1$ and $\lambda_2 < -1$, x_1^* and x_2^* are unstable and the transformation Π has no stable multiple fixed points.

There are 6 figures and 4 Soviet references.

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ASSOCIATION: Nauchno-issledovatel'skiy fiziko-tekhnicheskiy institut pri Gor'kovskom universitete (Scientific Research Physico-technical Institute of Gor'kiy University)

SUBMITTED: March 8, 1960

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LEONOV, N.N.

Discontinuous point transformation of a straight line into a straight line. Dokl. AN SSSR 143 no.5:1038-1041 Ap '62.
(MIRA 15:4)

1. Issledovatel'skiy fiziko-tekhnicheskiy institut Gor'kovskogo gosudarstvennogo universiteta im. N.I.Lebachevskogo. Predstavleno akademikom L.S.Pontryaginym.

(Transformations (Mathematics))

L 23810-65 EWT(d)/EPF(n)-2/EWP(v)/EWP(k)/EWP(h)/EWP(l) Po-4/Pq-4/Pf-4/Pg-4/Pu-4/Pk-4/Pl-4 IJP(c) WW/BC

ACCESSION NR: AP5002326 S/0141/64/007/005/0958/0969

AUTHOR: Leonov, N. N.

TITLE: Dynamics of a very simple extremal control system of the step-by-step type

SOURCE: IVUZ. Radiofizika, v. 7, no. 5, 1964, 958-969

TOPIC TAGS: extremal control system, control system dynamics, stepping type control, control system operating condition

ABSTRACT: Other papers dealing with systems of this type consider either symmetrical modes, or fail to take into account the dependence of the periodic modes on the initial conditions. The method of pointwise transformation is used to analyze the behavior of very simple extremal-regulation systems. A phase-space analysis of the equations of motion with application of the pointwise transformation method shows that there exists a continual set of periodic system

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operating modes, only a finite number of which is symmetrical. The dependence of these modes on the initial conditions is clarified. This makes it possible to estimate the error incurred in tracking the extremum of the nonlinear characteristic of the control object. Orig. art. has: 5 figures and 32 formulas.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-tekhnicheskiy institut pri Gor'kovskom universitete (Scientific Research Physicotechnical Institute at the Gor'kiy University)

SUBMITTED: 16Jan64 ENCL: 00 SUB CODE: IE, EC

NR REF SOV: 010 OTHER: 000

L 8905-66 EWT(d)/EWP(v)/T/EWP(k)/EWP(h)/EWP(l) IJP(c)

ACC NR: AP5026954 SOURCE CODE: UR/0103/65/026/010/1720/1727

AUTHOR: Leonov, N. N. (Gor'kiy)

ORG: None

TITLE: Theory of the simplest type of self-oscillating optimalizing control system

SOURCE: Avtomatika i telemekhanika, v. 26, no. 10, 1965, 1720-1727

TOPIC TAGS: optimal automatic control, mathematic analysis, automatic control theory, self adaptive control

ABSTRACT: The author considers the simplest type of self-oscillating optimalizing control system (with a one-dimensional controlled element). The control object is made up of an inertialess nonlinear link and an aperiodic link of the first order connected in series. The equations of motion for the system are:

$$\dot{\varphi}+\varphi=-u^*, \quad \dot{u}(t)=\eta(t-\theta), \quad \eta=\Phi[\dot{u},\sigma_1], \quad \sigma_1=\alpha_1\dot{\varphi}+\beta_1\ddot{\varphi};$$

$$\Phi[\dot{u},\sigma_1]=\begin{cases}+1, & \text{if } \dot{u}>0,\ \sigma_1>-\Delta \text{ or } \dot{u}<0,\ \sigma_1<-\Delta,\\ -1, & \text{if } \dot{u}<0,\ \sigma_1>-\Delta \text{ or } \dot{u}>0,\ \sigma_1<-\Delta,\end{cases}$$

where α_1, β_1, and Δ are positive parameters. Previous studies have shown that when $\beta_1=0$ there is a region among the states of the system where there is no search for an

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extremum at the output of the control object (i.e., the input of the object does not vary). This may cause search instability in real systems. When $\alpha_1 = 0$, a region of nondirectional search appears (i.e., for any state of the system within this region the input of the controlled element may either increase or decrease) which lowers the quality of the optimalizing search process at the output of the controlled element. In this paper it is shown that these disadvantages are practically eliminated when $\alpha_1 = \beta_1$. It is also shown that there is a unique stable periodic operating regime for the system. An explanation is given of the relationship between the parameters of the system and the average operating conditions for the period when the output of the control object deviates from the extremum. Orig. art. has: 6 figures, 11 formulas, and 1 table.

SUB CODE: 12, 09 / SUBM DATE: 05Mar64 / ORIG REF: 010

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L 07583-67 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(l) SOURCE CODE: UR/0141/66/009/004/0799/0809
ACC NR: AP6026939

AUTHOR: Leonov, N. N.

ORG: Scientific Research Institute of Applied Mathematics and Cybernetics at the Gor'kiy State University (Nauchno-issledovatel'skiy institut prikladnoy matematiki i kibernetiki pri Gor'kovskom gosudarstvennom universitete)

TITLE: Simplest extremal systems of the self-oscillating type with inertial objects

SOURCE: IVUZ. Radiofizika, v. 9, no. 4, 1966, 799-809

TOPIC TAGS: optimal automatic control, nonlinear automatic control, error minimization

ABSTRACT: The author analyzes the operation of a very simple extremal self-oscillating system with an object in the form of a series connected non-inertial link and a linear inertial second-order link. The nonlinear function $\Phi[\dot{u}, \dot{\varphi}]$ can be realized with the aid of two polarized relays. The differential equation of the system is

$$\ddot{\varphi} + 2h\dot{\varphi} + \varphi = -u^2, \quad \dot{u}(t) = \eta(t - \theta), \quad \eta = \Phi[\dot{u}, \dot{\varphi}],$$

$$\Phi[\dot{u}, \dot{\varphi}] = \begin{cases} +1, \text{ if } \dot{u} > 0 \text{ and } \dot{\varphi} > -\Delta \text{ or } \dot{u} < 0 \text{ and } \dot{\varphi} \leq -\Delta \\ -1, \text{ if } \dot{u} < 0 \text{ and } \dot{\varphi} > -\Delta \text{ or } \dot{u} > 0 \text{ and } \dot{\varphi} \leq -\Delta \end{cases},$$

and it is established that in phase space of this system there exists a region of gliding motions with the same dimensionality as the phase space itself. This not only

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makes it possible for the search operation to be unstable, but leads to an appreciable increase in the error involved in tracking the extremum of the output of the object. Ways of eliminating these shortcomings are indicated. Results of the study of an electronic model of this system, as investigated by M. Ya. Shtayerman are reported and oscillograms describing its behavior are shown. One of the ways of eliminating the shortcomings of the system is to use an optimizer constructed on the basis of information concerning the dynamic characteristics of the object. A simpler way is to construct the optimizer (the control device of the system) in such a way as to eliminate the gliding modes, by suitably controlling the motion of the phase point. A practical relay type optimizer is proposed for this purpose, also designed by M. Ya. Shtayerman. Other possible uses of this optimizer are described. Orig. art. has: 6 figures and 8 formulas.

SUB CODE: 09, 12/ SUBM DATE: 09Nov65/ ORIG REF: 004

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